ELECTRONICS REPORT
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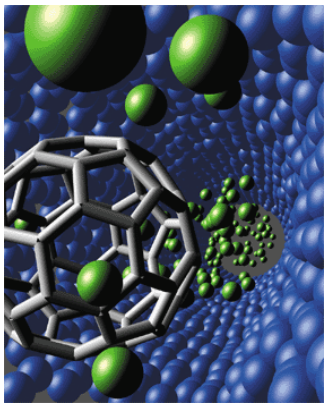
BUSINESS & MARKET NEWS

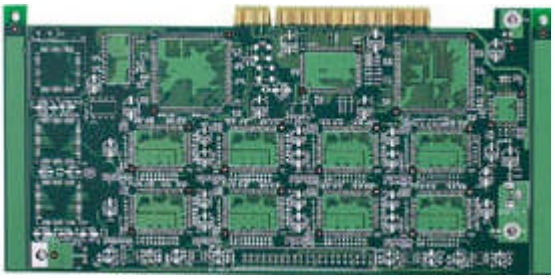


Hypocrisy of Nanotechnology - Nanotech seems to be getting more bad press lately as it searches for identity. Even the insiders aren't sure of a consistent definition and the financial community is getting more wary. Is nanotechnology a ground breaking powerful new technology? Or is it neither new nor really a singular technology? Is it really the next industrial revolution as some have called it? Some of us see Nanotech as familiar and incremental with developments that are somewhat inevitable. Australian ethicist Dr Robert Sparrow from the Centre for Human Bioethics at Monash University claims that widespread hypocrisy about nanotechnology is a worrying sign and he provides a detailed new critique of the contradictions inherent in the ongoing debate about nanotechnology. Here are excerpts as posted:

"A not-so-subtle hypocrisy pervades discussion of nanotechnology. Enthusiasts for nanotechnology make one set of claims when they want to advertise and promote this technology and another, often directly opposed, set of claims when skeptics about the technology question their enthusiasm. Consequently, the terms of the debate about nanotechnology shift to hamper substantial critical engagement about the future of this technology... A proper critical assessment of the impacts, costs, and benefits of the adoption of nanotechnology will not be possible until we can clear away some of the hype around it and adjudicate between the competing claims made on its behalf. If there are only different nanotechnologies, if they are already familiar to us, if we have a choice as to whether to develop them, and if they are adequately regulated by existing institutions or something like them, then there may well be nothing to be afraid of and no significant ethical issues that we need to resolve. If, alternatively, nanotechnology is a revolutionary new technology, the development of which appears to be inevitable, and which raises profound challenges to our regulatory systems as well as new ethical issues, then we would do well to proceed cautiously, if at all. Working out which of the very different claims made about nanotechnology are true is therefore essential if we're to be able to make informed decisions about it. However, the real problem arising from the existence of the contradictory claims I have highlighted is not so much that it is hard to work out which of them is true but that the combination of them functions to close down the space in which critical engagement with them might take place. Changing stories allows nano-enthusiasts to avoid having to discuss the full implications of their original claims. When advocates for nanotechnology want to drum up interest in it, or funding for it, they talk about nanotechnology and argue that it is revolutionary; when they want to defuse fears, they insist there are only nanotechnologies which are already familiar. When they want the public to accept nanotechnology they argue it is inevitable; when they want the government to provide more funding, change the laws, or educate the public to be more enthusiastic about it, they argue it is precarious. They allow that nanotechnology requires regulation but ignore the problems with the institutions that will be doing the regulating. While they routinely acknowledge the importance of ethical issues, they seldom acknowledge the possibility

that these might constitute a reason to turn away from developing nanotechnology. This pattern of claims reflects an attempt by advocates for nanotechnology to have the best of both worlds across these areas. As billions of dollars of public money are poured into nanotechnology research and as the products of nanotechnologies start to be introduced to unwitting consumers and to the environment, we can ill afford to defer discussion of the issues raised by nanotechnology any longer. It is time to hold all those involved in debates about nanotechnology to the claims they make and to highlight and condemn hypocrisy of the sorts I have identified here. If enthusiasts for nanotechnology try to change their stories when critics respond to their original claims, we should recognize this as a sign that they are more concerned about getting the public to embrace nanotechnology than they are about participating in a genuine debate about it. Yet a genuine, open and vigorous debate is precisely what is required if we want to continue to claim to be a democratic society while pursuing a technology with potentially widespread and profound social and environmental consequences. My hope is that this essay will help concerned individuals and organizations generate and participate in such a debate by identifying and responding to the hypocrisy which currently bedevils discussions of nanotechnology."

PCB Market - Single-digits Growth in 2007 - The global printed circuit board (PCB) market should only grow by 4% on year in terms of production value in 2007. The value growth could even shrink to the lows of 2002. The high-flying handset market growth rate will drop to 10% in 2007 from the previous year's 20% growth, despite that total shipments should hit new highs at 1.1-billion units. Inventory correction at Motorola and the new model launching schedule at Nokia are critical factors to judge the market trend for the year. China-based PCB makers say that the pursuit of environmental protection may suppress market growth but should place positive impact over the entire PCB industry. China is now the largest PCB market in terms of production value with a comprehensive supply chain. The solid support obtained from other Asia investors also prompts China PCB makers to enjoy stronger business growth than vendors from other regions. The stricter requirements on environment protection may dampen China PCB makers cost structure and technology transition, and may eventually slow down their expansions, but this may result in stabilizing price trends and better profitability in return.



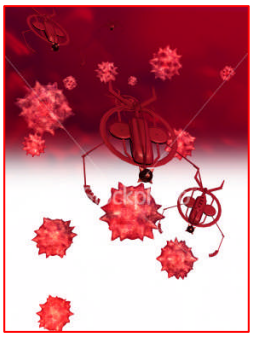
MATERIALS

Smart Materials Using Nanotechnology - Smart materials are defined as those with properties engineered to change in a controlled manner under the influence of external stimuli. These external influences can include temperature, force, moisture, electric charge, magnetic fields and pH. Nanotechnology has been entering the world of smart materials and taking them to the next level. Perhaps future nanotechnology enabled smart materials may be able to change and recombine much like the shape shifting cyborg in the movie Terminator 2.

Current Smart Materials
Existing smart materials are already an intrinsic part of modern society. These materials include:

- Piezoelectric - materials that either produce a voltage when stressed or alter shape under the influence of an electric charge.

- Thermoresponsive - these materials are sometimes also known as shape memory alloys or shape memory polymers. These materials alter their shape under the influence of the ambient temperature. Nitinol is an early example.
- Polychromic, Chromogenic or Halochromic - like thermoresponsive materials that alter their shape under the influence of the ambient temperature, magnetic shape memory alloys change shape due to changes in magnetic fields. Polychromic, Chromogenic or Halochromic Materials Polychromic, chromogenic and halochromic materials all change color due to external influences. These external influences can be alterations in pH, temperature, light or electricity. Materials that change color due to temperature are normally known as thermochromic materials and those that alter due to light are photochromic materials.

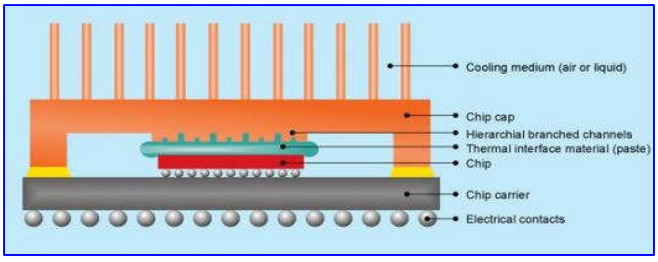


Applications for *smart nanomaterials* are expected to make their presence strongly felt in areas like healthcare, with smart materials that respond to injuries by delivering drugs and antibiotics or by hardening to produce a cast on a broken limb, implants and prostheses made from materials that modify surfaces and biofunctionality to increase biocompatibility, energy generation and conservation with highly efficient batteries and energy generating materials, security and defense with smart materials that can detect toxins and either render them neutral, warn people nearby or protect them from it. Smart textiles that can change colors, such as camouflage materials that change color and pattern depending upon the appearance of the surrounding environment. These materials may even project an image of what is behind the person in order to render them invisible.

But they level of sophistication can be increased. Surveillance could use “Smartdust” and “Smartdust Motes” that are nano-sized machines housing a range of sensors and wireless communication devices. Individually they could float undetected in a room with other dust particles. By combining the information gathered from hundreds, thousands or millions of these tiny specs can give a full report on what is occurring with the area including sound and images.

Nanotechnology Enabled Smart Materials can be relatively simple changes to existing technologies. The future however holds possibilities for extremely complex solutions for producing not only smart materials but also ones that are highly intelligent. These new materials may incorporate nano-sensors, nano-computers and nano-machines into their structure. This will enable them to respond directly to their environment rather than make simple changes caused by the environment. As an example, materials may be able to shape shift – comfortable, flexible clothing for motorcyclists could go rock hard if it detects an impact, or similar material worn by a police office could detect an approaching projectile and turn itself bullet proof. The current emerging technology of surface treatments for a wall that allows it to change color might be impressive now, but what if the wall material could change itself to produce a window where and when required. (AZoNano)

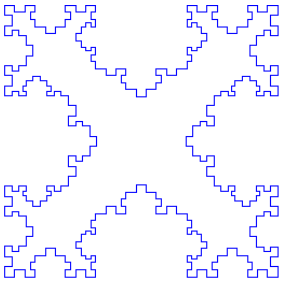
IBM Claims a "Breakthrough" The technology sure to revolutionize the processor cooling realm. IBM has created a system in which "tree-like branched trenches" are placed in the copper cap, where a newly thinned thermal paste can be applied with half the pressure of current renditions, netting a



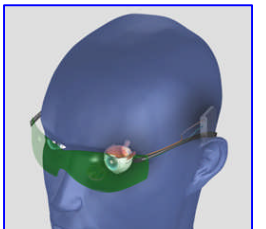
twofold increase in cooling performance. The micrometer-sized channels basically act as an "irrigation system" to allow the toasty particles to homogeneously escape rather than building up in the self-proclaimed "magic cross" section. *[Breakthrough? A real stretch.]*

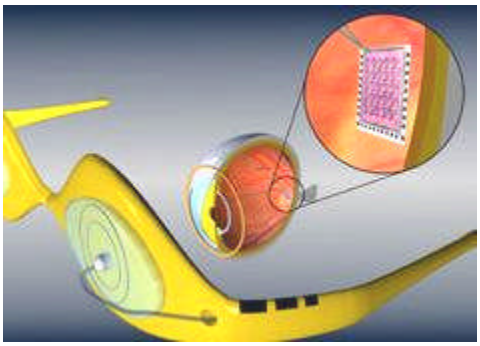
TECHNOLOGY

Fractal technology is said to provide the smallest antennas and Fractus SA (Barcelona, Spain), a pioneer, is offering an antenna for the 2.4-GHz band that is the size of a grain of rice, (3.7-mm x 2-mm). The antenna is intended for use in Bluetooth and mobile handsets. Fractal antenna technology is geometry-based, not material based. Therefore, fractal antennas are manufactured from standard materials and substrates, using standard processes. Companies can take advantage of maximum flexibility and cost-effectiveness, from design through to final assembly, with no need to change processes or deal with special materials to produce Fractus fractal antennas.



Sight Restoration - 2nd Sight Medical has just received FDA investigational device exemption (IDE) to begin clinical trials for their Argus II Retinal Prosthesis System. Their retinal prosthesis uses an array of electrodes to stimulate the retina, restoring a low level of vision in patients with degenerative diseases. Their first implant had 16 electrodes, the new Argus II has 60. The Argus II implant consists of an array of electrodes that are attached to the retina and used in conjunction with an external camera and video processing system to provide a rudimentary form of sight to implanted subjects. An IDE trial of the first generation implant (Argus 16), which has 16 electrodes, is ongoing at the Doheny Eye Institute at the University of Southern California. The Argus 16 was implanted in six RP subjects between 2002 and 2004 and has enabled them to detect when lights are on or off, describe an object's motion, count discrete items, as well as locate and differentiate basic objects in an environment. Five of these subjects are now using their Argus 16 retinal prostheses at home. The next generation Argus II retinal stimulator is designed with 60 independently controllable electrodes, which should provide implanted subjects with higher resolution images. Second Sight remains the only manufacturer with an actively powered permanently implantable retinal prosthesis under clinical study in the United States, and the technology represents the highest electrode count for such a device anywhere in the world.





IP

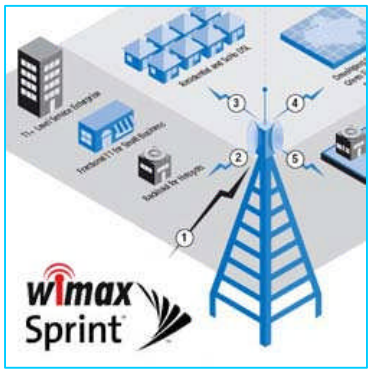
IP Protection in China? - China has passed its first private property law in the Communist era and we might hope that there will now be some IP protection. The recently approved legislation was designed specifically for the growing middle class real estate owners, private auto owners and entrepreneurs whose livelihoods depend on IP protection. But don't expect real legal IP protection in China. There are several reasons IP is likely to remain at risk. First, enacting a law will not change a decades-old mindset regarding individual versus collective rights. Second, the infrastructure for

investigating and enforcing IP laws is in nearly non-existent. Third, local judges have a great deal of authority in these cases and it is not clear how they will react. China is still the business-at-your-own-risk when it comes to IP protection. Susan Schwab, the U.S. trade representative, estimated that 80% of the pirated and counterfeited products that are seized at U.S. borders by the customs service come from China. If an electronics OEM were to decide between China and India strictly on the basis of IP protection, India would be the better bet. India has a long-established English legal system, and is attempting to strengthen enforcement and speed litigation. Until enough Chinese entrepreneurs have their own IP to protect, don't expect an all-out effort by Chinese authorities to enforce the laws. IP protection will be for the foreseeable future one of the risks that any electronics company must weigh when deciding if and what to outsource to China.

TELECOM

Will WiMAX Win the 4G Race? - Notebook-PC, Smartphone, and PDAs users love wireless-data services, but a clear gap exists between relatively short-range wireless-LAN, or Wi-Fi networks, and the wireless WANs that cellular carriers deploy. The cellular networks will never offer the bandwidth of Wi-Fi, and Wi-Fi won't scale to cover entire metropolitan areas. Mobile WiMAX (Worldwide Interoperability for Microwave Access) technology (IEEE 802.16e) can fill the gap, at least from a technology perspective. But it's less certain that WiMAX can achieve ubiquity across regions such as North America or the world. And everyone from IC vendors to cellular carriers have a different view of WiMAX's role both today and as the wireless world moves toward 4G networks. WiMAX could achieve anything from spot success to nearly the reach of cellular networks and offer mobile users a minimum of 1-Mbps services and perhaps 10-Mbps or even greater data rates.

Today, WiMAX networks are serving in developing regions that often lack a wired network. But WiMAX competes with cable and DSL; Clearwire is aggressively a WiMAX-class network in the United States. Clearwire is in more than 30 US markets with more than 200,000 subscribers. The company matches DSL and cable prices and offers a service with 1.5-Mbps download speeds. Sprint Nextel, meanwhile, is planning to rapidly roll out WiMAX across the United States. The combined Sprint Nextel owns a 2.5-GHz frequency spectrum that the company claims will cover 85% of the households in the top 100 US markets delivering 2- to 4-Mbps rates that potentially could reach 100 million people by the end of 2008. But in the United States, Sprint is uniquely positioned with a widely available spectrum that it can use in a rapid buildup. Has now become the leading technology candidate for 4G networks? Sprint, Intel, Samsung, and Motorola have used the 4G label in press releases about their partnership and deployment plans. 4G implies an evolution of previous-generation services. A 3G phone will still support older networks, and you might have trouble even finding a 3G connection today in North America.



The two primary 3G networks have evolved in the CDMA (code-division-multiple-access) and GSM (Global System for Mobile-communications) camps, in each case layered on the 2G frequency bands and the progression of modulation schemes that each side developed. Mobile

WiMAX is in a significantly different band and uses OFDM (orthogonal-frequency-division-multiplexing) technology. But the cellular and WiMAX players are set to collide. The close Sprint WiMAX partners—Intel, Samsung, Motorola, and Nokia—insist that WiMAX is simply a better fit than cellular technology in serving a host of new persistently connected consumer products. The group cites products such as portable game consoles and digital cameras as likely targets for WiMAX connections. Motorola, Samsung, and Nokia are poised to add Mobile WiMAX support into handsets, and Samsung is already selling such products in Korea that is supposed to be the early WiMAX proving ground. Korean companies and the government were quick to adopt a technology that would free them from the Qualcomm royalty burden. But the early Mobile WiMAX, or WiBro (wireless-broadband), news in Korea has been mediocre at best. Japan is next up in demonstrating the possibility of WiMax's future success. The government is preparing for a spectrum auction for wireless broadband. Intel's Nardone claims that four of the five participants are committed to WiMAX technology. Still, Japan could have the same problem as Korea, given Japan's fiber-to-the-home program and enthusiastic 3G-user base.EDNGlobal News

FCC Halts In-flight Phoning - On the heels of a study suggesting that so-called "picocells" placed on planes to communicate with phones won't completely eliminate paralyzing interference with ground towers, the FCC suggesting that the feds should hold off on lifting the in-flight calling ban. Apparently, the big issue revolves around phones operating on bands that aren't supported by the installed picocell; in the absence of that local communication, the handset goes right back to the traditional towers several miles below with potentially with disastrous effects to the network and other users. The chairman's suggestion doesn't prevent the agency's commissioners from approving the move anyway. [But isn't the bigger problem Phone Rage?]

INTERNATIONAL NEWS

China Power - China generates 16.6 % more electricity in 2007 - Data released by the China Electricity Council (CEC) shows that China generated 16.6 percent more electricity in the first two months of 2007 than the same period of last year; 447.966 billion kilowatt-hours. CEC had anticipated a 12.5% jump in energy output, but in fact, it climbed as high as 16.6%. Electricity use in 2006 increased 13.99 percent over 2005. The amount of electricity generated is a direct reflection of economic operations. The amount of energy generated by thermal power plants increased approximately 18% from the same period of last year, the largest of all the energy sectors. There was a 10% increase in hydraulic power output; 41.63 billion kilowatt-hours.

China is #1 machine tool market - China's consumption and imports of machine tools and imports have been the largest in the world for the last 5-years. The 2006 sales of machine tools hit $3.11-billion on the Chinese mainland market; the value of machine tool imports was $7.24-billion, up 11.55 % from 2005. The value of machine tool exports was $1.19-billion, up 44.56 percent from 2005.

BMW-India - Car manufacturing giant BMW inaugurated its assembly plant in southern Indian state Tamil Nadu Thursday, according to India-Asian News Service. The plant, located at

Chengalpattu, 40 km south of Tamil Nadu's capital Chennai, has a capacity of 1,700 vehicles a year. India offers big opportunities for growth, particularly in the premium automobile segment according to the chairman of BMW. Three BMW models will be marketed in India. The lowest priced 3- Series vehicle will cost $60,000 while the higher range can go up to $96,700, he said. But so far only the seats of the cars are being made in India and the rest of the parts are being imported. The doors of the cars will be manufactured in India and the company will not export its Indian products. BMW now has a distribution network of 12 dealers in the main cities like Mumbai, New Delhi, Chennai and Hyderabad and plans to double it by 2007. The goal is to seize all opportunities that arise for our three automotive brands BMW, MINI and Rolls-Royce. *Source: Xinhua*.

Intel Outside - Intel said it would invest $2.5 billion to build a microchip plant in northeastern China, with the production of chipsets to begin in 2010. Groundbreaking is scheduled for July for the 300mm-wafer fab in Dalian, which will be Intel's first semiconductor plant in Asia. The greenfield project will become Intel's eighth 300-mm factory, adding to a network spread across the United States, Ireland and Israel. The 12-inch wafer plant will have a monthly capacity of 52,000 wafers and will use 90-nm technology to produce chip sets, China's National Development and Reform Commission had said earlier this month. Chipsets are the collection of secondary chips and interfaces that surround the main processor and will be used in desktop computers, laptops and other electronic devices. The investment comes on top of the $1.3 billion Intel has spent on major test and assembly plants on the mainland. Intel has U.S. government approval to export 90-nm technology through 2009. But since the plant won't begin production until 2010, it could go to 65-nm if additional licenses were granted. Until now, most foreign chip makers have used China for lower-technology test and assembly work, with few doing more sophisticated production. *[Intel's motivation is not clear since low-cost labor doens't have much of an influence of chip production costs]*